

# GPS Controlled Large Scale Aerial Photographs for Capturing FIA Data

## The Problem

- ? Forest inventory data from ground plots are expensive.
- ? Some field plots are difficult to reach (e.g., wilderness areas).
- ? The quality of the information derived from the plots is compromised if un-measured plots are simply substituted with information from nearby accessible plot(s).
- ? Forest inventories are under increased pressure to produce better and more information at reduced costs.

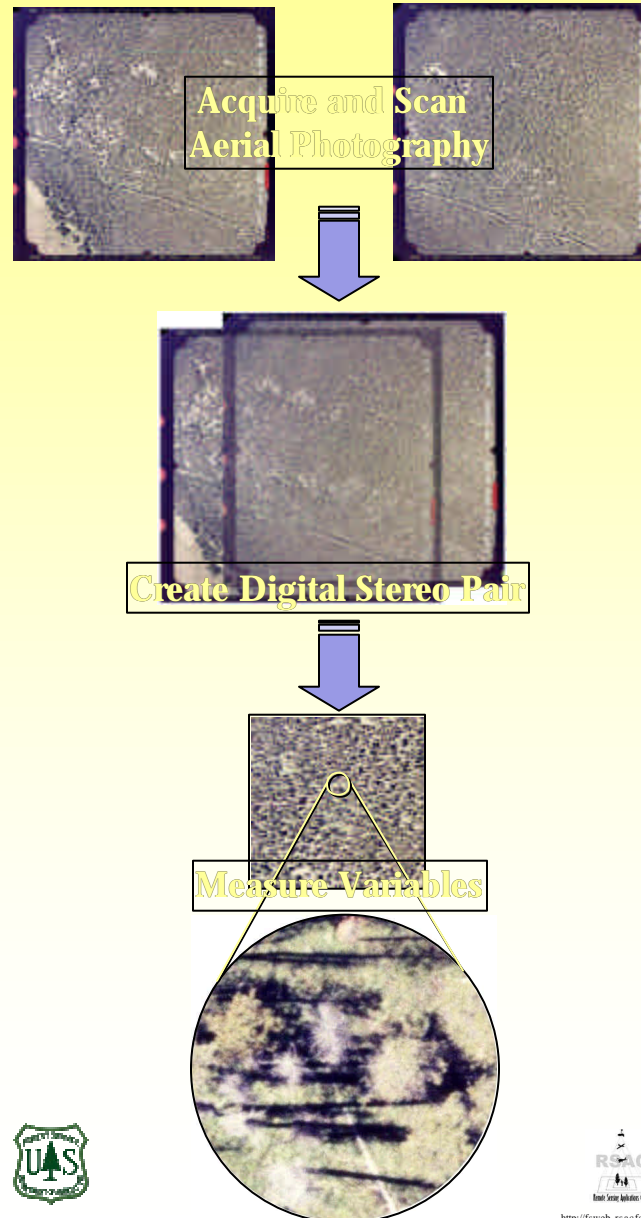


A remote sensing analyst using digital stereo-pairs to measure tree heights.

## A Solution

- ? Digital, analytical measurements from scanned aerial photographs offer an alternative to ground measurements.
- ? Recent Technology:
  - Photograph plots with precision using real-time GPS.
  - Scanning can capture most detail in negatives (~10 μ).
  - Computing power and software capable of managing the large image files and viewing the digital photos in stereo.
- ? These technologies allow
  - A view of field plots that add valuable measurements.
  - Provide a point of reference far into the future.

## The Process



## Image Properties

- ? The ability of an interpreter to measure forest variables from scanned aerial photography is determined by the photo quality, scan resolution, and scale that it is viewed.
- ? Unlike optical photo interpretation, today's interpreter can "zoom" into the stereo photos and capture very good detail at scales up to 1:30 with 1:4000 photos scanned at 10 μ.
- ? 9"x9" photographs can be scanned to 1.5" pixels, which allows individual leaves on a tree to be seen.
- ? The downside to this type of analysis is the file size - typically 1.0 to 1.5 gigabyte (GB) image files.

## Measurements

### Direct from Photos

- ? Tree Counts
- ? Tree Height
- ? Percent Crown Closure
- ? Visible Crown Diameter
- ? Species
- ? Crown Class
- ? Living / Dead
- ? Ground Layer Structure (when visible)
- ? Patch Sizes / Shapes

### Inferred from Photos or Modeled

- ? Land cover / Vegetation Type
- ? Volume (wood fiber, basal area)
- ? Diameter
- ? Wildlife Habitat
- ? Forest Growth
- ? Canopy Structure

## Next Steps

- ? Examine opportunities for data collection using different strategies within FIA.
- ? Finalize testing of aerial photography to be implemented in the FIA field design.
- ? Future work should focus on innovative ways of utilizing aerial photography, determined towards an optimization of data collection types.



<http://fweb.rsac.fs.fed.us>